

Claims

[c1] 1. A magazine-based data cartridge library comprising:
a cabinet;
a shelf system, located within said cabinet, for supporting at least two data cartridge magazines and comprising at least one shelf;
a drive that is located within said cabinet;
a magazine transport device, located within said cabinet, for moving a data cartridge magazine within a portion of an interior volume defined by said cabinet;
a cartridge transport device, located within said cabinet, for moving a data cartridge between a data cartridge magazine and said drive; and
an entry/exit port for conveying a data cartridge magazine between an environment that is exterior to said cabinet and a space that is interior to said cabinet;
wherein said space is accessible to said magazine transport device so that said magazine transport device can move a data cartridge magazine between said space and said shelf of said shelf system.

[c2] 2. A magazine-based data cartridge library, as claimed in claim 1, wherein:
said magazine transport device comprises:
a magazine picker for displacing a data cartridge magazine

towards and away from said entry/exit port; and
an elevator for moving said magazine picker.

[c3] 3. A magazine-based data cartridge library, as claimed in
claim 1, wherein:
said entry/exit port comprises a data cartridge magazine
orientation structure for inhibiting the loading of an incorrectly
oriented data cartridge magazine.

[c4] 4. A magazine-based data cartridge library, as claimed in
claim 1, wherein:
said entry/exit port comprises a tray with a lateral cross-
section that is asymmetrical relative to a plane that vertically
bisects said tray so as to inhibit the loading of an incorrectly
oriented data cartridge magazine.

[c5] 5. A magazine-based data cartridge library, as claimed in
claim 1, wherein:
said entry/exit port comprises a tray;
wherein said tray is comprised of a planar surface, a first side
surface that is operatively attached to said planar surface, and
a second side surface that is operatively attached to said
planar surface and substantially parallel to said first side
surface;
wherein said first side surface has a first shape and said
second side surface has a second shape that is different than
said first shape;

wherein said first and second shapes contribute to inhibiting the loading of an incorrectly oriented data cartridge magazine.

[c6] 6. A magazine-based data cartridge library, as claimed in claim 1, wherein:

 said entry/exit port comprises a tray;

 wherein said tray is comprised of a planar surface, a first surface that extends away from said planar surface, a second surface, and means for allowing said second surface to move between: (a) a first position that is in opposition to said first surface to prevent movement of a data cartridge magazine in a direction with a component transverse to said first and second surfaces, and (b) a second position that is not in opposition to said first surface so that a data cartridge magazine can be moved in a direction with a component transverse to said first and second surfaces.

[c7] 7. A magazine-based data cartridge library, as claimed in claim 1, wherein:

 said entry/exit port comprises a tray;

 wherein said tray is comprised of a planar surface, a first end surface that is operatively connected to said planar surface and extends away from said planar surface, a second end surface, and means for allowing said second end surface to move between: (a) a first position that is in opposition to said first end surface to prevent movement of a data cartridge

magazine in a direction with a component transverse to said first and second end surfaces, and (b) a second position that is not in opposition to said first surface so that a data cartridge magazine can be moved in a direction with a component transverse to said first and second end surfaces.

- [c8] 8. A magazine-based data cartridge library, as claimed in claim 7, wherein:
said means for allowing comprises a spring for biasing said second end surface towards said first position.
- [c9] 9. A magazine-based data cartridge library, as claimed in claim 7, wherein:
said second end surface comprises a cam follower surface for contacting a cam to place said second end surface in said second position.
- [c10] 10. A magazine-based data cartridge library, as claimed in claim 7, wherein:
said second end surface comprises an axle engagement structure; and
said means for allowing comprises an axle that is operatively attached to said axle engagement structure.
- [c11] 11. A magazine-based data cartridge library, as claimed in claim 7, wherein:
said tray is comprised of a first side surface and a second side

surface that is substantially parallel to said first side surface; wherein said first and second side surfaces cooperate to prevent movement of a data cartridge magazine in a direction with a component that is transverse to said first and second surfaces.

[c12] 12. A magazine-based data cartridge library comprising:

- a cabinet;
- a shelf system, located within said cabinet, for supporting at least two data cartridge magazines and comprising at least one shelf;
- a drive that is located within said cabinet;
- a magazine transport device, located within said cabinet, for moving a data cartridge magazine within a portion of an interior volume defined by said cabinet;
- a cartridge transport device, located within said cabinet, for moving a data cartridge between a data cartridge magazine and said drive; and
- an entry/exit port for conveying a data cartridge magazine between an environment that is exterior to said cabinet and a space that is interior to said cabinet and that is accessible to said magazine transport device so that said magazine transport device can move a data cartridge magazine between said space and said shelf of said shelf system;

wherein said entry/exit port comprises:

a magazine holder;
means for moving said magazine holder between: (a) a first position at which an operator can either readily associate a data cartridge magazine with said magazine holder or readily remove a data cartridge magazine from said magazine holder, and (b) a second position at which said magazine transport device can either associate a data cartridge magazine with said magazine holder or readily remove a data cartridge magazine from said magazine holder; and
a door mechanism for exposing and unexposing said magazine holder.

[c13] 13. A magazine-based data cartridge library, as claimed in claim 12, wherein:

said magazine transport device comprises:
a magazine picker for displacing a data cartridge magazine towards and away from said entry/exit port; and
an elevator for moving said magazine picker.

[c14] 14. A magazine-based data cartridge library, as claimed in claim 12, wherein:

said magazine holder comprises a magazine tray for supporting an overlying data cartridge magazine.

[c15] 15. A magazine-based data cartridge library, as claimed in claim 12, wherein:

said means for moving comprises a motor and a lead screw.

[c16] 16. A magazine-based data cartridge library, as claimed in claim 12, wherein:
said door mechanism comprises an exterior door that is movable between an open position at which said magazine holder is exposed to an exterior environment and a closed position at which said magazine holder is not exposed to the exterior environment.

[c17] 17. A magazine-based data cartridge library, as claimed in claim 16, wherein:
said door mechanism comprises a linkage for moving said exterior door between said open position and said closed position.

[c18] 18. A magazine-based data cartridge library, as claimed in claim 17, wherein:
said linkage extends between said exterior door and an actuator.

[c19] 19. A magazine-based data cartridge library, as claimed in claim 17, wherein:
said linkage extends between said exterior door and said means for moving.

[c20] 20. A magazine-based data cartridge library, as claimed in claim 17, wherein:
said linkage contributing to moving said exterior door between

said open position and said closed position during a time when
 said magazine holder is moving between said first position and
 said second position.

- [c21] 21. A magazine-based data cartridge library, as claimed in
 claim 12, wherein:
 said door mechanism comprises an interior door that is
 moveable between a closed position at which said magazine
 holder is not accessible to said magazine transport device and
 an a open position at which said magazine holder is
 accessible to said magazine transport device.
- [c22] 22. A magazine-based data cartridge library, as claimed in
 claim 21, wherein:
 said door mechanism comprises a linkage for moving said
 interior door between said open position and said closed
 position.
- [c23] 23. A magazine-based data cartridge library, as claimed in
 claim 22, wherein:
 said linkage extends between said interior door and an
 actuator.
- [c24] 24. A magazine-based data cartridge library, as claimed in
 claim 22, wherein:
 said linkage extends between said interior door and said
 means for moving.

[c25] 25. A magazine-based data cartridge library, as claimed in claim 22, wherein:
said linkage contributing to moving said interior door between said open position and said closed position during a time when said magazine holder is moving between said second position and said first position.

[c26] 26. A magazine-based data cartridge library, as claimed in claim 12, wherein:
said door mechanism comprises:
an exterior door that is movable between an exterior door open position at which said magazine holder is exposed to the exterior environment and an exterior door closed position at which said magazine holder is not exposed to the exterior environment; and
an interior door that is moveable between an interior door closed position at which said magazine holder is not accessible to said magazine transport device and an interior door open position at which said magazine holder is accessible to said magazine transport device.

[c27] 27. A magazine-based data cartridge library, as claimed in claim 26, wherein:
said door mechanism comprises:
an exterior door linkage for moving said exterior door between said exterior door open position and said exterior door closed

position; and

an interior door linkage for moving said interior door between said interior door open position and said interior door closed position.

[c28] 28. A magazine-based data cartridge library, as claimed in claim 27, wherein:

 said exterior door linkage extends between said exterior door and an exterior door actuator; and

 said interior door linkage extends between said interior door and an interior door actuator.

[c29] 29. A magazine-based data cartridge library, as claimed in claim 27, wherein:

 said exterior door linkage extends between said exterior door and said means for moving; and

 said interior door linkage extends between said interior door and said means for moving.

[c30] 30. A magazine-based data cartridge library, as claimed in claim 26, wherein:

 said door mechanism comprises means for coordinating the movements of said exterior door and said interior door such that:

 (a) during a time that said exterior door is moving between said exterior door open position and said exterior door closed position, said interior door is moving between said interior door

closed position and said interior door open position, and
(b) during a time that said exterior door is moving between
said exterior door closed position and said exterior door open
position, said interior door is moving between said interior door
open position and said interior door closed position.

- [c31] 31. A magazine-based data cartridge library, as claimed in
claim 30, wherein:
said means for coordinating comprises a linkage that extends
between said exterior door and said interior door.
- [c32] 32. A magazine-based data cartridge library, as claimed in
claim 31, wherein:
said linkage extends to an actuator.
- [c33] 33. A magazine-based data cartridge library, as claimed in
claim 31, wherein:
said linkage extends to said means for moving.
- [c34] 34. A magazine-based data cartridge library, as claimed in
claim 26, wherein:
said door mechanism comprises means for coordinating the
movements of said exterior door and said interior door such
that:
 - (a) during a time that said magazine holder is moving between
said first position and said second position, said exterior door
is moving between said exterior door open position and said

exterior door closed position and said interior door is moving between said interior door closed position and said interior door open position, and

(b) during a time that said magazine holder is moving between said second position and said first position, said exterior door is moving between said exterior door closed position and said exterior door open position and said interior door is moving between said interior door open position and said interior door closed position.

[c35] 35. A magazine-based data cartridge library, as claimed in claim 12, wherein:

 said door mechanism comprises:

 a door that lies in a plane; and

 a linkage that operates to rotate said door about an axis that is substantially parallel to said plane.

[c36] 36. A magazine-based data cartridge library, as claimed in claim 12, wherein:

 said door mechanism comprises:

 a first door that lies in a first plane;

 a first linkage that operates to rotate said first door about a first axis that is substantially parallel to said first plane;

 a second door that lies in a second plane; and

 a second linkage that operates to rotate said second door about a second axis that is substantially parallel to said

second plane.

[c37] 37. A magazine-based data cartridge library, as claimed in claim 36, wherein:

 said door mechanism comprises:

 means for causing said first door to rotate between a first door open position and a first door closed position and said second door to rotate between a second door open position and a second door closed position.

[c38] 38. A magazine-based data cartridge library, as claimed in claim 36, wherein:

 said door mechanism comprises:

 means for coordinating the movements of said first door and said second door such that:

 (a) during a time that said first door is rotating between said first door open position and said first door closed position, said second door is rotating between said second door closed position and said second door open position, and

 (b) during a time that said first door is rotating between said first door closed position and said first door open position, said second door is rotating between said second door open position and said second door closed position.

[c39] 39. A magazine-based data cartridge library, as claimed in claim 36, wherein:

 said door mechanism comprises:

means for coordinating the movements of said first door and said second door such that:

(a) during a time that said magazine holder is moving between said first position and said second position, said first door is rotating between said first door open position and said first door closed position and said second door is rotating between said second door closed position and said second door open position, and

(b) during a time that said magazine holder is moving between said second position and said first position, said first door is rotating between said first door closed position and said first door open position and said second door is rotating between said second door open position and said second door closed position.

[c40] 40. A magazine-based data cartridge library, as claimed in claim 12, wherein:

said door mechanism comprises:

a door that lies in a plane; and

a guide structure that constrains said door to move in said plane.

[c41] 41. A magazine-based data cartridge library, as claimed in claim 40, wherein:

said guide structure constrains said door to translate within said plane.

[c42] 42. A magazine-based data cartridge library, as claimed in claim 40, wherein:
said guide structure constrains said door to rotate within said plane.

[c43] 43. A magazine-based data cartridge library, as claimed in claim 12, wherein:
said door mechanism comprises:
a first door that lies in a first plane;
a first guide structure that constrains said first door to move in said first plane;
a second door that lies in a second plane; and
a second guide structure that constrains said second door to move in said second plane.

[c44] 44. A magazine-based data cartridge library, as claimed in claim 43, wherein:
said first guide structure constrains said first door to translate within said first plane; and
said second guide structure constrains said second door to translate within said second plane.

[c45] 45. A magazine-based data cartridge library, as claimed in claim 43, wherein:
said door mechanism comprises:
means for causing said first door to move between a first door open position and a first door closed position and said second

door to move between a second door open position and a second door closed position.

[c46] 46. A magazine-based data cartridge library, as claimed in claim 43, wherein:

 said door mechanism comprises:

 means for coordinating the movements of said first door and said second door such that:

 (a) during a time that said first door is moving between said first door open position and said first door closed position, said second door is moving between said second door closed position and said second door open position, and

 (b) during a time that said first door is moving between said first door closed position and said first door open position, said second door is moving between said second door open position and said second door closed position.

[c47] 47. A magazine-based data cartridge library, as claimed in claim 43, wherein:

 said door mechanism comprises:

 means for coordinating the movements of said first door and said second door such that:

 (a) during a time that said magazine holder is moving between said first position and said second position, said first door is moving between said first door open position and said first door closed position and said second door is moving between

said second door closed position and said second door open position, and

(b) during a time that said magazine holder is moving between said second position and said first position, said first door is moving between said first door closed position and said first door open position and said second door is moving between said second door open position and said second door closed position.

[c48] 48. With respect to a magazine-based data cartridge library magazine that comprises a cabinet and a magazine transport device located within the cabinet, a method for moving a magazine holder between an environment that is exterior to the cabinet and a space that is interior to the cabinet and accessible to the magazine transport device, the method comprising:
providing an entry/exit port for conveying a data cartridge magazine between an environment that is exterior to the cabinet and a space that is interior to the cabinet;
wherein said entry/exit port comprises a magazine holder for supporting a data cartridge magazine;
placing said magazine holder in one of a first position and a second position;
wherein when said magazine holder is at said first position, an operator is either readily able to associate a data cartridge

magazine with said magazine holder or readily able to remove a data cartridge magazine from said magazine holder; wherein when said magazine holder is at said second position, a magazine transport device is either readily able to associate a data cartridge magazine with said magazine holder or readily able to remove a data cartridge magazine from said magazine holder; and moving said magazine holder between said first position and said second position.

- [c49] 49. A method, as claimed in claim 48, wherein:
said step of moving comprises translating said magazine holder.
- [c50] 50. A method, as claimed in claim 48, wherein:
said step for moving comprises rotating said magazine holder.
- [c51] 51. A method, as claimed in claim 48, wherein:
said step of moving comprises rotating a door that lies in a plane about an axis that is substantially parallel to said plane.
- [c52] 52. A method, as claimed in claim 48, wherein:
said step of moving comprises rotating a door that lies in a plane about an axis that is substantially perpendicular to said plane.
- [c53] 53. A method, as claimed in claim 48, wherein:
said step of moving comprises translating a door that lies in a

plane within said plane.

[c54] 54. A method, as claimed in claim 48, wherein:
said step of moving comprises coordinating the movement of
an exterior door and an interior door so that:
(a) during a time that said exterior door is moving between an
exterior door open position at which said magazine holder is
exposed to the exterior environment and an exterior door
closed position at which said magazine holder is not exposed
to the exterior environment, said interior door is moving
between an interior door closed position at which said
magazine holder is not accessible to said magazine transport
device and an interior door open position at which said
magazine holder is accessible to said magazine transport
device; and
(b) during a time that said exterior door is moving between
said exterior door closed position and said exterior door open
position, said interior door is moving between said interior door
open position and said interior door closed position.

[c55] 55. A method, as claimed in claim 48, wherein:
said step of moving comprises coordinating the movement of
an exterior door and an interior door so that:
(a) during a time that said magazine holder is moving between
said first position and said second position, said exterior door
is moving between an exterior door open position at which

said magazine holder is exposed to the exterior environment and an exterior door closed position at which said magazine holder is not exposed to the exterior environment, and said interior door is moving between an interior door closed position at which said magazine holder is not accessible to said magazine transport device and an interior door open position at which said magazine holder is accessible to said magazine transport device; and

(b) during a time that said magazine holder is moving between said second position and said first position, said exterior door is moving between said exterior door closed position and said exterior door open position, said interior door is moving between said interior door open position and said interior door closed position.